Radiological Control Division

Building 120
P.O. Box 5000
Upton, NY 11973-5000
Phone 631 344-2593
Fax 631 344-7018
Weilandics@bnl.gov

managed by Brookhaven Science Associates
for the U.S. Department of Energy

BROOKHAVEN NATIONAL LABORATORY

Memo

date: *Sept. 29, 2008*

to: *N. Gmür*

from: *C. Weilandics*

subject: *Bldg. 902B/Room #20 RF Equipment Survey (2008)*

At the request of NSLS-II ESH Management, on Sept. 26, 2008, a survey of the following RF signal generating/test equipment was conducted:

The system which was measured is dedicated for characterization of a Libera Brilliance Beam Position Monitor receiver (manufacturer Instrumentation Technologies, S/N B09HI-NS01-001). It is a four channel RF receiver with embedded PC.

A CG635 synthesized clock generator provides 1 V peak-to-peak 10 MHz master clock for the entire system (manufacturer Stanford Research Systems, S/N 1529). The clock is fanned out with a FS710 distribution amplifier which has seven outputs with the same parameters at the clock generator (manufacturer Stanford Research Systems, S/N 74230).

The main RF signal is generated by a N5181A analog signal generator (manufacturer Agilent, S/N SG47071016). The output is 10 dBm (10 mW) at 500 MHz with maximal available power of 20 mW. The output is pulsed modulated by an external arbitrary function/waveform generator 33220A by Agilent (S/N SG44001741), which produced rectangular pulses (0 to 1 V with 80% duty factor) at 378.5 kHz.

The temperature inside the rack was monitored by 6½ digit multimeter (Keithley model 2100) connected to platinum probe PT100.

For these measurements, electric (E) field surveys were conducted using a calibrated (Oct. 27, 2007) Narda 8718B Electromagnetic Radiation Survey meter. The E field probe used is capable of measuring RF over the frequency ranges of 300 kHz to 50 GHz. Because the frequency of the waveform generator above was below 300 MHZ, a magnetic field survey was also performed using the Narda A8732D probe which is sensitive over a frequency range of 300 kHz to 200 MHz. The meter can be set to read out in a variety of units, however, for the purpose of this survey it was set to read out in percent of standard. During the survey of the equipment, measurements were taken around the cabinet housing the equipment, specifically at the panel joints where one might expect some leakage. Also surveyed were the accessible portions of the cables and their connections. In addition to a general survey, for the cabinet, a spatial average was performed where an individual might be expected to stand, in front of the rack. This spatial average is typically measured by scanning a planar area equivalent to the area occupied by standing adult human being (projected area). In most cases a simple linear vertical scan of the fields over a 2 m height will be sufficient. In our

case, this consisted of an average reading of eight equally spaced points over this 2 meter height, again in front and back of the equipment being surveyed.

Results

For this set of measurements, we found no appreciable (< 1% of the standard) RF from the equipment measured. The standard for exposure to non-ionizing radiation which BNL has referenced is the IEEE C95.1-1999 standard also referenced by ACGIH. The general TLVs for RF and microwaves are not expected to change.

IH99SR.08
Cc: B. Bacha
J. Peters
I. Pinayev
O. Singh